

Extension of the GenEO DDM to Saddle Point problem

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Abstract

We introduce an adaptive element-based domain decomposition (DD) method for solving saddle point problems defined as a block two by two matrix. The algorithm does not require any knowledge of the constrained space. We assume that all sub matrices are sparse and that the diagonal blocks are spectrally equivalent to a sum of positive semi definite matrices. The latter assumption enables the design of adaptive coarse space for DD methods that extends the GenEO theory to saddle point problems. Numerical results on three dimensional elasticity problems for steel-rubber structures discretized by a finite element with continuous pressure are shown for up to one billion degrees of freedom along with comparisons to Algebraic Multigrid Methods.

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